TRANSMITTAL OF APPEAL BRIEF (Large Entity)	Docket No. GL-12 (GL-01-8)

In Re Application Of: **Fiorenzo Renzi et al.**

Serial No.	Filing Date	Examiner	Group Art Unit
09/830,841	May 1, 2001	S.A. Acquah	1711

Invention: **LIQUID COMPOSITION POLYMERIZABLE INTO ORGANIC GLASSES HAVING GOOD OPTICAL PHYSICO-MECHANICAL PROPERTIES**

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

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09/17/02
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In re Application of: :

Fiorenzo Renzi et al. :

U.S. Serial No. 09/830,841 : Group Art Unit: 1711

Filed May 1, 2001 : Examiner: S.A. Acquah

Docket No. GL-12 (GL-01-8) :

Title: LIQUID COMPOSITION POLYMERIZABLE INTO ORGANIC GLASSES HAVING GOOD OPTICAL AND PHYSICO-MECHANICAL PROPERTIES :

Assistant Commissioner for Patents
Washington, D.C. 20231

APPEAL BRIEF

Sir:

This Is an Appeal from the Final Rejection of Claims 1-27 in the Final Office Action of March 8, 2002. A Notice of Appeal was received in the Patent Office on July 9, 2002 This Brief is being submitted in triplicate.

REAL PARTY IN INTEREST

Rights In the present application are assigned to GREAT LAKES CHEMICAL (EUROPE) GmbH, Bahnhofplatz 65, Frauenfeld, Switzerland, CH8500, which is the sole real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to the Applicants or Applicants' legal representative which will directly affect or be directly affected by or have a bearing on the Board's decision in this pending Appeal in the present application.

STATUS OF CLAIMS IN THE APPLICATION

Claims 1-27 are in this application and their rejection is being appealed. No claim is allowed.

STATUS OF AMENDMENTS AFTER FINAL ACTION

An Amendment After Final Rejection is being submitted herewith for the purpose of correcting an obvious and inadvertent error in Claim 25.

SUMMARY OF THE INVENTION

One aspect of the present invention as recited in Claim 1 resides in a liquid composition which is polymerizable, by means of radical polymerization with low shrinkage, into organic glasses, comprising the product obtained from the transesterification of a diallylcarbonate (A) with a mixture of one or more linear or branched aliphatic diols (B), containing from three to ten carbon atoms in the molecule with a linear or branched aliphatic polyol (C), containing from four to twenty carbon atoms and from three to six hydroxyl groups in the molecule, wherein the molar ratio (A) / (B+C) ranges from 2.5/1 to 4/1 and the quantity of (C) in the mixture (B+C) ranges from 5% by weight to 20% by weight with respect to the total weight of said mixture (B+C) (page 5, lines 5-24), e.g., a weight of C of

5% to less than 20% of the weight of (B+C) (Example 1 and compositions 2, 3 and 4 on pages 14-19, Claim 26), or 5%-13.4% of C based on the weight of (B+C) (Example 1, page 15, lines 4-5, Claim 27). Diols which can be used are diethylene glycol, triethylene glycol, tetraethylene glycol, 1,4-butanediol, 1,6-hexanediol, 1,3-propanediol, neopentylglycol, dipropyleneglycol, or 2,2,4-trimethyl-1,3-pentanediol (page 6, lines 5-8, Claim 2), and preferably diethylene glycol and/or neopentyl glycol (page 6, lines 9 and 10, Claim 3), and polyols which can be used are pentaerythritol, trimethylolpropane, dipentaerythritol, ditrimethylolpropane, or tris(hydroxyethyl) isocyanurate (page 6, lines 17-19, Claim 4), preferably pentaerythritol or trimethylolpropane (page 6, lines 20 and 21, Claim 5).

The liquid composition may be obtained starting form diallyl carbonate (A) and from the mixture (B+C) operating under transesterification conditions, at a temperature ranging from 80°C to 160°, in the presence of a catalyst of the alkaline type, and continuously eliminating the allyl alcohol which is formed as reaction by-product (page 6, line 22 to page 7, line 5, Claim 6). The transesterification is preferably carried out at a temperature ranging form 90°C to 130°C, and the catalyst of the alkaline type which can be used may be selected from: hydroxides, carbonates and alcoholates of alkaline metals, organic bases, basic ion-exchange resins (page 7, lines 6-9, Claim 7), specifically sodium hydroxide, sodium carbonate, or sodium methylate (page 7, lines 10-12, Claim 8). The catalyst is conveniently used in a quantity equal to at least 1 ppm (parts per million by weight) with respect to the sum of the weights of components (B+C) (page 7, lines 13-15, Claim 9) and preferably in a quantity ranging from 0.01% to 0.3% by weight with respect to the sum of the weights of components (B+C) (page 7, lines 16 and 17, Claim 10). The transesterification reaction may be carried out at a pressure, for example, of from 60 mbar to 1030 mbar (page 7, lines 22 and 23, Claim 11), preferably 60 mbar to 500 mbar (page 7, lines 23 and 24, Claim 12) for a reaction time ranging form 0.5 hour to 20 hours (page 8, line 1, Claim 13), preferably 0.5 hour to 3 hours (page 8, line 2, Claim 14).

The liquid composition may have one or more conventional additives present, selected from the group consisting of oxidation, light and heat stabilizers, lubricants, dyes, pigments, UV-absorbers, and IR-absorbers, in a total quantity not exceeding 1 part by weight for every 100 parts by weight of the compositions (page 10, liens 1-8, Claim 15). The composition may also contain one or more polymerization initiators, which are soluble in the composition itself and generate free radicals within a temperature range of 30°C to 120°C (page 9, lines 3-6, Claim 16), e.g., a peroxide (page 9, lines 7-9, Claim 17), preferably dicyclohexylperoxydicarbonate, diisopropylperoxydicarbonate, dibenzoylperoxide, di-s-butyl-peroxydicarbonate, or s-butyl-cyclohexylperoxydicarbonate (page 9, lines 11-14, Claim 18), or a perketal (page 9, lines 15 and 16, Claim 19), preferably 1,1-di-(t-butylperoxy)-cyclohexane, 1,1-di-(t-butylperoxy)-3,3,5-trimethyl-cyclohexane, 1,1-di-(t-amyl-peroxy)-cyclohexane, 1,1-di-(t-butyl-peroxy)-2-methyl-cyclohexane, or 1,1-di-(t-amylperoxy)-2-methylcyclohexane (page 9, lines 18-22, Claim 20). The quantity of initiator used may vary within a range of 1 to 6 parts by weight for every 100 parts by weight of the composition (page 9, lines 23-25, Claim 21).

Another aspect of the invention includes organic glasses obtained by the polymerization of liquid compositions prepared by the transesterification process in its broadest terms as described previously (page 1, lines 9 and 16, Claim 23 and page 5, lines 5-24, Claim 1) and in particular by transforming by polymerization the liquid composition containing a polymerization initiator into organic glasses operating at a temperature ranging from 30°C to 120°C, with polymerization times which generally range from 1 hour to 100 hours (page 10, lines 13-18, Claim 22).

Still another aspect of the invention resides in objects which can be obtained from the processing of the organic glasses of this invention, including ophthalmic lenses and solar filters, protective shields, sight windows, solar and photovoltaic collectors and panels, substrates for optical disks, panels for display, and video terminals (page 10, line 22 to page 11, line 1, Claim 24). Related to this aspect of the invention is a process for manufacturing

optical lenses from a liquid composition as previously described in its broadest terms (page 5, lines 5-24, Claim 1) by means of radical polymerization, utilizing a casting technique comprising pouring the composition containing a free radical polymerization initiator into the cavity of a mould and polymerizing the composition by means of a thermal treatment (page 11, line 19 to page 12, line 7, Claim 25).

ISSUE

The sole issue in this Appeal is whether the rejection of Claims 1-27 under 35 USC §102(b) as being clearly anticipated by *Renzi et al.*, United States Patent No. 4,970,293, is in error.

GROUPING OF CLAIMS

The ground of rejection which is contested herein applies to more than one claim, and such additional claims, to the extent separately identified and argued below, do not stand or fall together.

ARGUMENT

As started, the sole issue in this Appeal is whether the rejection of Claims 1-27 under 35 USC §102(b) as being clearly anticipated by *Renzi et al.*, United States Patent No. 4,970,293 is in error.

Renzi et al. disclose a liquid composition polymerizable by free radical polymerization with a low shrinkage, to yield organic glasses of high thermal stability, such liquid composition being a product of the transesterification of diallyl carbonate (A) with a mixture of a diol (B) and a polyol (C) containing 3 to 6 hydroxy groups in the molecule by operating with a molar ratio of A / (B+C) equal to or larger than 3/1, preferably 3/1 to 12/1, with an amount of (C) in the (B+C) mixture equal to or smaller than 70%, preferably 20 to 60% by weight.

In arguing the rejection of the claims as "clearly anticipated" by *Renzi et al.*, it should be noted first that there is no single species, i.e., specific composition, of *Renzi et al.* which falls both within the weight percent range of polyol (C) in the mixture of aliphatic diol (B) and (C) of 5 to 20% by weight, and the range of molar ratios of A/B+C from 2.5/1 to 4/1 recited in Applicants' independent Claim 1. The Examiner therefore is apparently relying on the overlapping between Applicants' range of weight percent of C/B+C of 5 to 20% and the broad range of "equal to or lower than 70%" or the narrower range of "20 to 60" disclosed by *Renzi et al.*, and between Applicants' range of molar ratios of A/B+C of 2.5/1 to 4/1 and the broad range of "equal or higher than 3/1" or the narrower range of "3/1 to 12/1" disclosed by *Renzi et al.* It is submitted, however, that this is not sufficient alone as the basis for an anticipation rejection under 35 USC §102. Thus, as pointed out in MPEP 2131.03, 8th Ed., in cases involving overlapping ranges, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute" and "what constitutes 'sufficient specificity' is fact dependent. If the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with 'sufficient specificity' to constitute an anticipation of the claims". The foregoing quoted language from the MPEP section is believed to be directly in point with regard to the instant rejection. Thus, both the broad range of "equal to or lower than 70%" and the narrow range of "20 to 60%" of *Renzi et al.* applied to the weight percent of C/B+C are both much broader than Applicants' range of "5 to 20%", with the minimum of 20% of the narrower range of 20 to 60% of *Renzi et al.* touching Applicants' maximum of 20% at only a single point. Similarly the broad range of "equal to or higher than 3/1" and the narrower range of "3/1 to 12/1" disclosed by *Renzi et al.* for the molar ratio of A/B+C are both much broader than the range of 2.5/1 to 4/1 claimed by Applicants.

It can also be seen from the results shown in Tables 1, 2 and 3 of the specification that the compositions of the present invention can be used to make organic glasses having

perceptibly better properties, e.g., of yellow index, impact strength, abrasion resistance, and dyeability (Y), than the composition of *Renzi et al.*, as well as having lower shrinkage during polymerization. This would not have been predicted from the *Renzi et al.* disclosure by a person having ordinary skill in the art and is therefore an unobvious result which supports a lack of sufficient specificity in the disclosure of *Renzi et al.* necessary for a holding of anticipation under 35 USC §102.

In reply to the foregoing argument which was first made in an Amendment filed by Applicants December 21, 2001, the Examiner states as follows in the Office Action of March 8, 2002 finally rejecting the claims (paragraph quoted in its entirety):

> The cited prior art of record in the previous communication discloses liquid glass forming composition from diallyl carbonate and diol mixture. It is Applicants' position that the cited prior art is different because "no single species, i.e., specific composition falls within the weight percent range of polyol (C) in the mixture of aliphatic diol (B) and (C) of 5 to 20% by weight, or the molar ratio of A/B+C of 2.5/1 to 4/1". It is the Examiner's position that Applicants' argument is not convincing, and in this regard, Applicants' attention is herein directed to column 1, beginning with line 55 through column 2, line 12, and to claims 1 and 4 which clearly recite that the molar ratio (A)/(B+C) is equal to or higher than 3/1 (claim 1 recites 2.5/1 to 4/1), and the amount of (c) in the (B+C) mixture equal to, or lower than 70, preferably 200-60 as in claim 4 (claim 1 recites 5-20). Thus all the limitations of claim 1, and the remaining dependent claims are met by the disclosures of the cited prior art.

This explanation of the rejection is puzzling since it is clear from the portion of the *Renzi et al.* disclosure cited by the Examiner (col. 1, line 55 to col. 2, line 12 and claims 1 to 4) that no single species, i.e., specific composition which would unequivocally anticipate Applicants' claimed compositions, is identified by such disclosure. Rather, this disclosure merely describes ranges of materials which touch or overlap the claimed range. The situation involving this rejection therefore falls squarely within the conditions described in the first part of the second section of MPEP §2103.03, Eighth Edition, referred to previously and now quoted in its entirety:

> When the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute. What constitutes a "sufficient specificity" is fact dependent. If the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. The unexpected results may also render the claims unobvious. The question of "sufficient specificity" is similar to that of "clearly envisaging" a species from a generic teaching. See MPEP §2131.02.

This language of the MPEP makes it clear that it cannot be concluded that Applicants' claims are "clearly anticipated" by mere perusal of the reference disclosure. Rather, it is necessary to determine whether the reference discloses the claimed subject matter, mainly the ratios of reactants utilized, with "sufficient specificity" to anticipate the claims. Relevant to this determination according to MPEP §2103.03 is whether, "if the claims are directed to a narrow range and the reference teach a broad range, there is evidence of unexpected results within the claimed narrow range." With regard to these ranges, it should again be noted that Applicants' claimed range of molar ratios of diallyl carbonate to the total of diol and polyol (A/B+C) is 2.5/1 to 4/1, whereas *Renzi et al.* disclose a broad overlapping range of "equal to or higher than 3/1" and a narrower overlapping range of "3/1 to 12/1", both of which are substantially broader than Applicants' claimed range. Similarly, Applicants' claimed range of weight percent of polyol to the total of diol and polyol is 5 to 20% by weight which is much narrower than the broad range of "equal to or lower than 70% by weight" or the narrower range "20 to 60%" disclosed by *Renzi et al.* Also relevant to the question of whether Applicants' ranges are shown with "sufficient specificity" as provided for in MPEP §2103.03 is the fact that none of the nine specific compositions disclosed by *Renzi et al.* (Examples 1-3 and compositions 1-4, 11 and 12) which react diallyl carbonate with a diol and a linear or branched aliphatic polyol containing at least three hydroxy groups,

includes ranges of ratios of reactants which are within the ranges of both A/B+C and percentage of C in the mixture of B+C claimed by Applicants. More specifically, only three of the disclosed compositions (compositions 1, 4 and 11) have a A/B+C molar ratio touching Applicants' maximum of 4/1, with such molar ratios of the remaining nine compositions being higher than 4/1, the highest being 12/1 (Example 2). Moreover, the percentages C/B+C of all the compositions of *Renzi et al.* prepared from compounds included in Applicants' claims, are higher than Applicants' maximum of 20%, with the lowest being 25% (compositions 1 and 2) and the highest being 50% (composition 11).

With respect to the effect of evidence of unexpected results within the claimed narrow range on the question of "sufficient specificity", mentioned in MPEP §2103.03, it should again be noted that the results shown in Tables 1, 2 and 3 of the specification indicate that the compositions of the present invention can be used to make organic glasses having perceptibly better properties, e.g., of yellow index, impact strength and abrasion resistance, than the composition of *Renzi et al.*, as well as having lower shrinkage during polymerization. Furthermore, as has been stated, these results would not have been predicted from the *Renzi et al.* disclosure by a person having ordinary skill in the art and therefore support a conclusion of lack of sufficient specificity in the disclosure of *Renzi et al.* necessary for a holding of anticipation under 35 USC §102.

Finally, it is submitted that there are additional grounds for reversing the rejection of Claims 19, 20, 26 and 27 under 35 USC §102(b) as anticipated by *Renzi et al.*, since each of these claims includes a feature in addition to those discussed previously in connection with the rejection of Claim 1, which is not disclosed by the reference. The features undisclosed by *Renzi et al.* are the polyketals recited in Claims 19 and 20, the range of the quantity of (C) in the mixture of (B+C) of from 5% by weight to less than 20% by weight, recited in Claim 26, and such range of quantity of (C) in the mixture of (B+C) of 5% by weight to 13.4% by weight recited in Claim 27.

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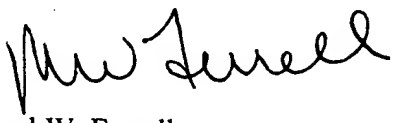
In view of the foregoing arguments, reversal of the Final Rejection and allowance of all the claims on appeal are earnestly solicited.

Respectfully submitted,



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APPENDIX

CLAIMS ON APPEAL

1. (Amended) A liquid composition which is polymerizable, by means of radical polymerization with low shrinkage, into organic glasses, comprising the product obtained from the transesterification of a diallylcarbonate (A) with a mixture of one or more linear or branched aliphatic diols (B), containing from three to ten carbon atoms in the molecule with a linear or branched aliphatic polyol (C), containing from four to twenty carbon atoms and from three to six hydroxyl groups in the molecule, wherein the molar ratio (A) / (B + C) ranges from 2.5/1 to 4/1 and the quantity of (C) in the mixture (B+C) ranges from 5% by weight to 20% by weight with respect to the total weight of said mixture (B+C).

2. The composition according to claim 1, wherein the diols (b) are: diethylene glycol, triethylene glycol, tetraethylene glycol, 1,4-butanediol, 1,6-hexanediol, 1,3-propanediol, neopentylglycol, dipropyleneglycol, 2,2,4-trimethyl-1,3-pentaendiol.

3. The composition according to claim 2, wherein the diols are diethylene glycol and neopentylglycol.

4. (Amended) The composition according to claim 1, wherein the polyols (c) are: pentaerythritol, trimethylolpropane, dipentaerythritol, ditrimethylolpropane, tris(hydroxyethyl) isocyanurate.

5. The composition according to claim 4, wherein the polyols are pentaerythritol and trimethylolpropane.

6. (Amended) The composition according to claim 1, obtained starting from diallyl carbonate (A) and from the mixture (B+C) operating under transesterification conditions, at a temperature ranging from 80°C to 160°, in the presence of a catalyst of the alkaline type, and continuously eliminating the allyl alcohol which is formed as reaction by-product.

7. The composition according to claim 6, wherein the transesterfication is carried out at a temperature ranging form 90°C to 130°C, and the catalyst of the alkaline type is selected from: hydroxides, carbonates and alcoholates of alkaline metals, organic bases, basic ion-exchange resins.

8. The composition according to claim 7, wherein the catalyst of the alkaline type is selected from: sodium hydroxide, sodium carbonate, sodium methylate.

9. (Amended) The composition according to claim 6, wherein the catalyst is used in a quantity equal to at least 1 ppm (parts per million by weight) with respect to thee sum of the weights of components (B+C)

10. The composition according to claim 9, wherein the catalyst is used in a quantity ranging form 0.01% to 0.3% by weight with respect to the sum of the weights of components (B+C).

11. (Amended) The composition according to claim 6, wherein the transesterification reaction is carried out at pressure values ranging from 60 mbar to 1030 mbar.

12. The composition according to Claim 11, wherein the transesterification reaction is carried out at pressure values ranging from 60 mbar to 500 mbar.

13. (Amended) The composition according to claim 6, wherein the reaction times range from 0.5 hours to 20 hours.

14. The composition according to claim 13, wherein the reaction times range from 0.5 hours to 3 hours.

15. (Twice Amended) The composition according to Claim 1, wherein one or more conventional additives are present, selected from the group consisting of oxidation, light and heat stabilizers, lubricants, dyes, pigments, UV-absorbers, and IR-absorbers, in a total quantity however not exceeding 1 part by weight for every 100 parts by weight of the compositions themselves.

16. (Twice Amended) The composition according to Claim 1, wherein one or more polymerization initiators are present, which are soluble in the composition itself and generate free radicals within a temperature range of 30°C to 120°C.

17. The composition according to claim 16, wherein the polymerization initiators belong to the group of peroxides.

18. The composition according to claim 17, wherein the peroxides are: dicyclohexyl-peroxydicarbonate, diisopropylperoxydicarbonate, dibenzoylperoxide, di-s-butyl-peroxydicarbonate, s-butyl-cyclohexylperoxydicarbonate.

19. The composition according to claim 16, wherein the polymerization initiators are perketals.

20. The composition according to claim 19, wherein the perketals are: 1,1-di-(t-butylperoxy)-cyclohexane, 1,1-di-(t-butylperoxy)-3,3,5-trimethyl-cyclohexane, 1,1-di-(t-amyl-peroxy)-cyclohexane, 1,1-di-(t-butyl-peroxy)-2-methyl-cyclohexane, 1,1-di-(t-amylperoxy)-2-methylcyclohexane.

21. (Amended) The composition according to clam 16, wherein the quantity of initiator used varies within a range of 1 to 6 parts by weight for every 100 parts by weight of said composition.

22. (Amended) The composition according to claim 16, which is transformed into the relative organic glasses operating at a temperature ranging from 30°C to 120°C, with polymerization times which generally range from 1 hour to 100 hours.

23. (Amended) Organic glasses obtained from the polymerization of the composition according to claim 1.

24. Ophthalmic lenses and solar filters, protective shields, sight windows, solar and photovoltaic collectors and panels, substrates for optical disks, panels for display, video terminals obtained from the processing of the organic glasses according to claim 23.

25. (Twice Amended) A process for manufacturing optical lenses from a liquid composition which is polymerizable, by means of radical polymerization with low shrinkage, into organic glasses, said composition comprising the product obtained from the transesterification of a diallylcarbonate (A) with a mixture of one or more linear or branched aliphatic diols (B), containing from three to ten carbon atoms in the molecule with a linear or branched aliphatic polyol (c), containing from four to twenty carbon atoms and from three to six hydroxyl groups in the molecule, wherein the molar ratio (A) / (B+C) ranges from 2.5/1 to 4/1 and the quantity of (C) in the mixture (B+C) ranges from 5% by weight to 20% by weight with respect to the total weight of said mixture

(B+C), said process being a casting technique comprising pouring said composition containing a free radical polymerization initiator into the cavity of a mould and polymerizing the composition by means of a thermal treatment.

26. The composition of Claim 1, wherein the quantity of (C) in the mixture of (B+C) ranges from 5% by weight to a maximum of less than 20% by weight.

27. The composition of Claim 26, wherein said maximum is 13.4% by weight.